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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,828	03/03/2004	Masakiyo Matsumura	249687US2	1522
22850 7590 01/02/2008 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT; P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER SONG, MATTHEW J	
			ART UNIT 1792	PAPER NUMBER
			NOTIFICATION DATE 01/02/2008	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/790,828

Applicant(s)

MATSUMURA ET AL.

Examiner

Matthew J. Song

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3, 5, 11, 15-18 and 20-39 is/are pending in the application.
- 4a) Of the above claim(s) 20-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3, 5, 11, 15-18, and 39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/5/2007 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 3, 5, 11 and 39 are rejected under 35 U.S.C. 102(b) as anticipated by Taniguchi (US 5,710,620).

Taniguchi discloses an apparatus comprising a phase shifted reticle where the angle of diffracted light generated from a pattern of the reticle varies with the line width and pitch of the pattern (col 10, ln 15-40 and col 12, ln 45-60), this reads on applicant's phase modulation element. Taniguchi also teaches an illumination system 1 used to generate light beams which enter the phase modulation element (col 5, ln 1-15 and col

10, ln 15-30). Taniguchi also teaches an image formation optical system **7A, 8** provided on an outgoing radiation side of the phase modulation element **R** (col 5, ln 1-67 and Fig 1). Taniguchi also discloses a stage **WS** for holding a wafer **W** (col 6, ln 45-65 and Fig 1). Taniguchi also teaches the phase shift reticle (phase modulation element) has at least two phase modulation elements and is configured to transmit light (Fig 3A). Taniguchi also teaches a plane which is orthogonal to a light incidence direction being defined by a first and second direction (Fig 1 shows the light vertical and the reticle horizontal and the reticle extends in the vertical and horizontal directions in Fig 11A). Taniguchi also teaches strip like areas which extend parallel to the second direction and to which first and second phase values are given. (Fig 11A and 12A show strip like areas and discloses a plurality of normal patterns with different preciseness (line width and pitch) (col 12, ln 40-65), thus produces different phase values).

Regarding the limitation, “each of the phase modulation units is optically smaller than a radius of a point spread distribution range of the image formation optical system when converted to an image formation surface to the image formation optical system and the radius of the point spread distribution range of the image formation optical system is defined to satisfy the follow equation:” and “the phase modulation element has a plurality of cells each of which is optically smaller than the radius of the point spread distribution range of the image formation optical system converted to the image formation surface” The limitation is an intended use limitation based on the desired radius of a point spread distribution from the optical system. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the

prior art structure is capable of performing the intended use, then it meets the claim. Taniguchi discloses all of the apparatus limitation, as discussed previously, and the apparatus is capable of changing the illumination conditions, ring zone illumination and grading illumination by the arrangement of the parts, thus would be capable of the producing a point spread distribution radius which is optically large than the phase modulation element. The same argument applies to claims 3, 5, 11 and 39 directed to features of the phase modulation element compared to the radius of a point spread distribution.

Referring to claim 39, claim 39 has all of the same limitations as claim 3, which was discussed previously. Claim 39 further requires "in at least one direction" which is met because the apparatus is capable of producing a radius of a point spread distraction range of the image formation optical system that is larger than the phase modulation element is at least one direction.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were

made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi (US 5,710,620) as applied to claims 1-14 and 19 above, and further in view of Applicant's admitted prior art (AAPA)

Taniguchi discloses all of the limitations of claim 15, as discussed previously, except the phase modulation element turns the incident light beam to a light intensity distribution with a concave pattern that a light intensity is increased toward the periphery from a central area having a first intensity.

In a method of manufacturing a semiconductor, AAPA teaches a phase shifter and light absorption distribution are combined to irradiate a film with light beams having a intensity including a concave pattern and an inverse pattern (pg 3, line 1 to pg 4, ln 25 of the specification). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Taniguchi by using the phase shifter taught by AAPA to produce a desirable light intensity pattern for the manufacture of semiconductors.

Referring to claim 16-18, the combination of Taniguchi and AAPA teaches concave and an inverse peak pattern.

Response to Arguments

6. Applicant's arguments filed 10/5/2007 have been fully considered but they are not persuasive.

Applicant alleges that the apparatus is not taught by Taniguchi is noted but not found persuasive. Taniguchi teaches all of the limitations, as discussed previously; therefore the argument is not persuasive.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shiraishi (US 5,715,089) teaches a pattern of stripe and pixels (Fig 7A and 7C).

Kunii et al (US 6,388,386) teaches modulating a intensity of light beam using a cyclic light and dark pattern using a line, wavy lines and grid pattern (Abstract and Fig2A-2D).

Lin et al (US 5,539,568) teaches the size of the beam of light modulated by each pixel or element of the phase modulator should be no larger than the minimum feature of the mask (col 7, ln 40-65).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song
Examiner
Art Unit 1792

MJS
December 20, 2007



ROBERT KUNEMUND
PRIMARY EXAMINER